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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/062,956	01/31/2002	Shing Lee	42P15256	4575

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EXAMINER
VALENCIA, DANIEL E

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/062,956	Applicant(s) SHING ET AL.	
	Examin r Daniel E Valencia DV	Art Unit 2874	

-- The MAILING DATE of this communication appears on th cover sh t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11-19,21-29,31-39,41-49,51-59,61-69 and 71-79* is/are rejected.

7)☒ Claim(s) *10,20,30,40,50,60,70 and 80* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Brian Healy
Primary Examiner

DETAILED ACTION

Inventorship

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6, 21-26, 41-46, and 61-66 are rejected under 35 U.S.C. 102(e) as being anticipated by Liu U.S. Patent Application Publication No. 2002/0197013. Examiner would note that although the referenced application publication (Liu et al.) and the present application are *now* commonly owned, they do not have a common inventor and the referenced application publication was not commonly owned *at the time of invention.* Therefore, the Liu reference is applicable prior art against the claimed invention.

Liu discloses a method and apparatus for tuning a laser with a Bragg grating in a semiconductor substrate with all the limitations of the claimed invention. Regarding claims 1, 21, 41, and 61, Liu discloses a wavelength tunable laser (fig. 1, 2, 7 and 8) comprising: a gain means with an active emission section (121 or 721) that generates light; a waveguide including a core (119), the core optically coupled to the active emission section for receiving light (125), the core having a refractive index (n_{si}), the core including more than one diffraction grating ($\lambda 1$-$\lambda 3$), each diffraction grating having a different Bragg wavelength; a substrate (709) supporting the waveguide and the gain means; a thermo-optical material (117) adjacent to each diffraction grating, the refractive index of the thermo-optical material (n_{poly}) adjacent to each diffraction is less than the refractive index of the core (paragraph 41); and temperature changing means (115) in the thermo-optical material adjacent to each diffraction grating. Liu further discloses that when the temperature of the thermo-optical material adjacent each diffraction grating, except for a chosen diffraction grating, is less than an off (fig 4, 25

degrees C) temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser (paragraph 61), as described by claims 2, 22, 42, and 62. With reference to claims 4, 24, 44, and 64, Liu discloses that when the temperature of the thermo-optical material adjacent each diffraction grating, except for a chosen diffraction grating, is greater than an off temperature (125 degrees C for this embodiment), the magnitude of the light reflected by the chosen refraction grating is sufficient to cause single mode lasing of the wavelength tunable laser. Regarding claims 5, 25, 45, and 65, Liu's disclosure teaches that when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or less than the off temperature (125 degrees C for the embodiment), the magnitude of the light reflected by the chose diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser. Liu discloses that the off temperature is in the range of –65 degrees to 100 degrees Celsius, as mentioned in claims 6, 26, 46, and 66. Similarly regarding claims 3, 23, 43, and 63, when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or greater than the off, temperature (25 degrees C), the magnitude of light reflected by the chosen grating is sufficient to cause a single mode lasing of the wavelength tunable laser.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7-9, 27-29, 47-49, and 67-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu. Liu as applied above, discloses essentially all the elements of the claimed invention. However, the reference fails to explicitly disclose the off temperature of the second embodiment (claim 7), as well as the phase control portion.

On the other hand, one of ordinary skill in the art would recognize that the refractive index of optical and thermo-optical materials can manipulated with ease. Different types of materials with different types of dopant concentrations have different temperature index sensitivity. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a thermo-optical material with a different temperature sensitivity (rather than polysilicon), such that the off temperature of the second embodiment would be in the range of –65 to 100 degrees Celsius, as mentioned in claims 7, 27, 47, and 67.

Additionally, although not explicitly stated, the diffraction grating free portion of the core would inherently function as a phase control section, as mentioned in claims 8, 28, 48, and 68. Furthermore, the thermo-optical material of the grating is positioned in proximity to the control section and the temperature changing means, as explained in claims 9, 29, 49, and 69. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the lengths of the grating free portions, such that an appropriate phase relationship is achieved.

Claims 11-16, 31-36, 51-56, and 71-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Pezeshki U.S. Patent No. 6,591,038. Refer to the appropriate drawings or parts of the specification. Liu as applied above, discloses a tunable wavelength laser with essentially all the elements of the claimed invention, including the elements of claims 12-19, 32-39, 52-59, and 72-79 (limitations addressed above). However, the reference does not disclose an index loading region adjacent to each diffraction grating.

On the other hand, Pezeshki discloses an optical interleaver device with a series of Bragg gratings (fig. 1, 3, 6, and 7) that teaches the limitations that the Liu reference does not expressly mention. Regarding parts of claims 11, 31, 51, and 71, Pezeshki discloses the advantages of using index loading regions in a waveguide device that utilizes gratings. Pezeshki teaches that it is advantageous to use index loading regions in series to achieve a desired reflectivity and refraction index profile (col. 6, lines 1-23). One of ordinary skill would recognize the advantages to using index loading regions adjacent gratings in order to manipulate the difference between the grating index and the core index of the fiber. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use index loading regions, as taught by Pezeshki, adjacent the gratings disclose in Liu.

Allowable Subject Matter

Claims 10, 20, 30, 40, 50, 60, 70, and 80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: As to dependent claims mentioned above, the prior art alone or in combination fails to disclose or render obvious a laser of claims 9, 19, 29, 39, 49, 59, 69, and 79, respectively, wherein the thermo-optical material is selected from the group comprising a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, and a polymer derived from norbornene. For example, Liu discloses a thermo-optical material with a high coefficient; however, the reference fails to disclose or even suggest one of the abovementioned polymers.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gao U.S. Patent Application Publication No. 2003/0067945 discloses a tunable optical waveguide laser with tunable thermo-optical polymers adjacent gratings.

Clapp U.S. Patent No. 6,459,533 discloses a tunable optical filter including thermo-optical material.

Robinson U.S. Patent Application Publication No. 2002/0191912 discloses a compensation apparatus and a method using sampled Bragg gratings.

Siala U.S. Patent No. 5,914,972 discloses a thermal compensator for waveguide DBR laser sources that utilizes thermo-optical material for changing the pitch of gratings.

Nam U.S. Patent No. 6,021,141 discloses a tunable blue laser diode.

Catchmark U.S. Patent Application Publication No. 2003/0039443 discloses an optical waveguide and grating structure fabricated using polymeric and dielectric compositions.

The prior art documents submitted by the applicant in the Information Disclosure Statement filed on April 19, 2002, have all been considered and made of record (note attached copy of form PTO-1449).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel E Valencia whose telephone number is (703)-305-4399. The examiner can normally be reached on Monday-Friday 9:30-6:00.

The fax phone numbers for the organization where this application or proceeding is assigned are (703)-308-7724 for regular communications and (703)-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

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July 24, 2003

Brian Healy
Primary Examiner